International Journal for Research in Emerging Science and Technology, Volume-1, Issue-1, Jun 2014, ISSN: 2349-7610

Enhancement the performance of EDRP by adaptive hello messaging scheme for neighbor discovery in wireless ad-hoc network

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Abstract

In mobile ad hoc networks (MANETs), the network topology changes frequently and unpredictably due to the arbitrary mobility of nodes. This feature leads to frequent path failures and route reconstructions, which causes an increase in the routing control overhead. Effective routing protocol needed to developed or modifying existing one. Protocols can be divided into topology- and position-based protocols but the protocol have physical position knowledge effective than others to overcome the unpredictably due to the arbitrary mobility of nodes. An estimated distance (EstD)-based routing protocol (EDRP) may become the best choice between position-based protocols; because position-based protocols used GPS to found the node location but EDRP not used it, this is the reason to used the EDRP. In EDRP review found that, performance of EDRP on focused on energy efficiency. This is main motivation of this paper investigation and evaluation of EDRP. In investigation found packet delivery ratio and the average end-to-end delay give some negative effect, when the node distribution is very sparse. EDRP used Hello packet when the time elapsed from the last broadcasting packet (RREQ, RERR, or some other broadcasting packets) is greater than the value of the Hello Interval does the node need to send a Hello packet.

This increase the risk that a sender will transmit a packet (Hello packet) through a broken link that has not been detected by Hello messaging. It is the reason because of that of the performance metrics of routing protocol affected. To overcome that problem this paper proposed used “An Adaptive Hello Messaging Scheme for Neighbor Discovery in On-Demand MANET Routing Protocols”, that suppression of unnecessary Hello messaging. Based on the event interval of a node, the Hello interval can be enlarged without reduced detestability of a broken link, which decreases network overhead and hidden energy consumption. May also enhance the performance of other metrics of EDRP which is generating the negative effect.

Keyword: MANET, AODV, EDRP, Hello packet

1. Introduction

In mobile ad hoc networks (MANETs), the network topology changes frequently and unpredictably due to the arbitrary mobility of nodes. This feature leads to frequent path failure and route reconstructions, which causes an increase in the routing control overhead. Thus, it is imperative to reduce the overhead of route discovery in the design of routing protocols of MANETs. There are many routing protocols have been proposed for MANETs in the past few years. According to whether they depend on physical position knowledge, these protocols can be divided into topology- and position-based protocols. Position-based routing protocols that know the physical position of the nodes have a feature to restrict the propagation of RREQ packets within a narrow region. However, the geographic knowledge is not available in many scenarios. In the absence of positioning service, another option proposed in EDRP, an estimated distance

(EstD)-based routing protocol (EDRP) to steer a route discovery in the general direction of a

destination, which can restrict the propagation range of route request (RREQ) and reduce the routing overhead. Each node needs Hello packets to advertise its existence and sense the existence of other nodes. Therefore, the EDRP protocol incurs the overhead of Hello packets, to reduce the negative effect of Hello packets; in EDRP not used a periodical Hello mechanism. Send hello packet only when the time elapsed from the last broadcasting packet (RREQ, RERR, or some other broadcasting packets) is greater than the value of the Hello Interval does the node need to send a Hello packet. Here is the risk that a sender will transmit a packet (Hello packet) through a broken link that has not been detected by Hello messaging; in [3] call that the probability of failure of detection of an unavailable link (PFD). To reduce that risk in [3] proposed novel approach "An Adaptive Hello Messaging Scheme for Neighbor Discovery in On-Demand MANET Routing Protocols", this approach estimate this risk by an average event interval, that is, an average time gap between two consecutive events (i.e., sending or receiving a data packet) on a node. By monitoring the event intervals, it can estimate how actively a node is involved in sending or forwarding. If a node is not involved in any communication for a given period, it does not need to maintain the status of the link; Hello packets broadcasted during this period are unnecessary. If a constant Hello interval is used, the risk of attempting to transmit a packet through a broken link decreases as the event interval increases. Instead of using a constant Hello interval, this paper proposed scheme uses a constant risk level. As the event interval increases, the Hello interval can also increase without increasing risk. If the event interval is extremely large, the Hello messaging interval is also correspondingly large; that is Hello messaging is practically suppressed. When a node receives or sends a packet, the Hello messaging interval is reset to a default value so that up-to-date information is kept in a neighbor table for active communication. This scheme suppresses unnecessary Hello messaging and reduces the energy consumption without any additional delay.

2. Background

Frequent path failures and route reconstructions, which causes an increase in the routing control overhead. Thus, it is imperative to reduce the overhead of route discovery in the design of routing protocols of MANETs. Result in lower packet delivery ratio and longer end-to-end delay. It is very important to reduce the routing overhead in route discovery and maintenance. There are many routing protocols have been proposed for MANETs in the past few years. According to whether they depend on physical position knowledge, these protocols can be divided into topology- and position-based protocols. Position-based routing protocols that know the physical position of the nodes have a feature to restrict the propagation of RREQ packets within a narrow region. An estimated distance (EstD)-based routing protocol (EDRP) to steer a route discovery in the general direction of a destination, which can restrict the propagation range of route request (RREQ) and reduce the routing overhead. It have the feature of Position-based routing, it discover the position of node without GPS services [1]. Link lifetime is crucial for the accurate analysis of MANET parameters and protocols. The model could deviate from reality, being more conservative and underestimating the distribution of link lifetime, especially when the ratio R/v between the radiuses of the communication range R to the node speed v becomes large. With respective the issue an analytical model of link lifetime in MANETs to date, and characterizes link lifetime as a function of node mobility proposed in [2]. The importance of this model is twofold. First, it enables answering many questions regarding fundamental tradeoffs in throughput, delay, and storage requirements in MANETs, as well as the relationship between many cross-layer design choices (e.g., information block segmentation) and network dynamics (e.g., how long links last in a MANET). Second, it enables the development of analytical models for channel access and routing schemes by allowing such protocols to use link lifetime expressions that are accurate with respect to simulations based on widely-used mobility models. In [3], the unnecessary Hello messaging can drain batteries while mobile devices are not in use. The reactive Hello protocol enables Hello messaging only when it is demanded using a Hello request-reply mechanism, but increases delay due to additional packet exchange before communication. The event-based Hello protocol enables only active nodes (i.e., those either sending or receiving data packets)

to broadcast Hello packets based on a threshold called an activity timer. However, a threshold that is set too high rarely reduces the Hello messaging overhead, whereas a low threshold results in local connectivity information loss. Thus, there is an outstanding need to effectively suppress unnecessary Hello messaging while minimizing the risk of losing local connectivity information.

3. Previous work done

Ad hoc on-demand distance vector routing (AODV) and dynamic source routing (DSR) in are topology-based and on-demand routing protocols. Both protocols use flooding to discover routes only when needed, which incurs a small routing overhead. The gossip-based ad hoc routing is an efficient optimization scheme for flooding, where each node forwards a packet with a probability. The objective of flooding RREQ packets is to find the destination, not to disseminate data to the entire network. Therefore, even if one flooding scheme can minimize the number of rebroadcast packets to the theoretical best-case bound provided by the minimum connected dominating set, which is the smallest set of rebroadcasting nodes, this best-case bound is not the lowest bound for route discovery. In position-based protocols, each node determines its own position through Global Positioning System (GPS) or some other positioning services, and these protocols attempt to use some position information to restrict the flooding region. The distance routing effect algorithm for mobility (DREAM), a typical directed flooding routing protocol. In DREAM, every node maintains the location information of other nodes in routing tables and sends packets in the direction that is computed based on these location tables. The polarized gossip protocol (PGP), in the PGP protocol, the gossiping probability of a node is determined by the difference between the distance to the destination of itself and the distance to the destination of its previous node [1]. The performance of routing protocols in a MANET exhibits a direct relationship to the mean value of link lifetime pioneered the analytical evaluation of link dynamics. More conservative and underestimating the distribution of link lifetime, especially when the ratio R/v between the radius of the communication range R to the node speed v becomes large, such that nodes are likely to change their velocity and direction during an exchange. Networks play an important role in the real world, where nodes usually travel only a portion of the entire network. In the information assurance framework such networks represent the more realistic scenarios for tactical users, especially for the users deployed in the division and rear area. It covers delay aspects of such networks, but only for the case of one-dimensional restricted mobility. For this reason, strive to provide the first thorough analysis of two-dimensional restricted mobility networks on link dynamics, optimal segmentation of information stream, throughput, delay, and storage tradeoffs [2]. In [3], used only traditional routing protocol for performance evaluation and not declare clear winner of the compressions. only it overcome the previous performance evaluation by evaluating the performance of traditional routing protocol on basis of effect of unvarying pause time and effect of varying number of nodes. This work may be extending with different new than traditional routing protocol and evaluate the performance with existing scenario. Many Hello messaging schemes focus on figuring out dynamic network topology or discovering live neighbors with an energy saving scheme, which requires all network nodes to continuously exchange Hello messages or beacons while they are awake. In such traditional Hello messaging schemes no start/end condition proposed. This can cause unnecessary bandwidth usage and hidden energy consumption if an on-demand MANET routing protocol AODV, or DYMO used, where a new path is discovered through Route Request (RREQ) and Route Response (RREP) packet exchanges. Two approaches for suppressing Hello messages when they are not required proposed an on-demand mechanism (reactive Hello protocol), and a monitoring activity mechanism (event-based Hello protocol). An adaptive Hello interval scheme in [3] used to reduce battery drain through practical suppression of unnecessary Hello messaging. Based on the event interval of a node, the Hello interval can be enlarged without reduced detestability of a broken link, which decreases network overhead and hidden energy consumption.

4. Existing methodology

Frequent path failures and route reconstructions, which causes an increase in the routing control overhead. Thus, it is imperative to reduce the overhead of route discovery in the design of routing protocols of MANETs. Result in lower

packet delivery ratio and longer end-to-end delay. It is very important to reduce the routing overhead in route discovery and maintenance. An algorithm to estimate the distance of two nodes without positioning service. The EstD includes two parts: a) the estimated geometrical distance (EGD), which is based on the change regularity of the received signal strength (RSS) at the contact time of two nodes to estimate the future geometrical distance after the nodes have parted from each other, and b) the estimated topological distance (ETD), which is a topology-based EstD to refine the inaccurate estimation of the EGD when it grows large. By using the EstD, divided the entire network area into three zones: a) src-Zone; b) dst-Zone; and c) other-Zone. In each different zone, adopt a different strategy to forward RREQ packets [1]. The analytical model of link lifetime in MANETs to date, and characterizes link lifetime as a function of node mobility. The importance of this model is twofold. First, it enables answering many questions regarding fundamental tradeoffs in throughput, delay, and storage requirements in MANETs, as well as the relationship between many cross-layer design choices (e.g., information block segmentation) and network dynamics (e.g., how long links last in a MANET). Second, it enables the development of analytical models for channel access and routing schemes by allowing such protocols to use link lifetime expressions that are accurate with respect to simulations based on widely-used mobility models [2]. The unnecessary Hello messaging can drain batteries while mobile devices are not in use. The reactive Hello protocol enables Hello messaging only when it is demanded using a Hello request-reply mechanism, but increases delay due to additional packet exchange before communication. The event-based Hello protocol enables only active nodes (i.e., those either sending or receiving data packets) to broadcast Hello packets based on a threshold called an activity timer. However, a threshold that is set too high rarely reduces the Hello messaging overhead, whereas a low threshold results in local connectivity information loss. Thus, there is an outstanding need to effectively suppress unnecessary Hello messaging while minimizing the risk of losing local connectivity information [3].

5. Analysis and Discussion

Frequent path failures and route reconstructions, which causes an increase in the routing control overhead. Thus, it is imperative to reduce the overhead of route discovery in the design of routing protocols of MANETs. Result in lower packet delivery ratio and longer end-to-end delay. It is very important to reduce the routing overhead in route discovery and maintenance. In [1], an estimated distance (EstD)-based routing protocol (EDRP) to steer a route discovery in the general direction of a destination, which can restrict the propagation range of route request (RREQ) and reduce the routing overhead. Each node needs Hello packets to advertise its existence and sense the existence of other nodes. Therefore, the EDRP protocol incurs the overhead of Hello packets, to reduce the negative effect of Hello packets; in EDRP not used a periodical Hello mechanism. Send hello packet only when the time elapsed from the last broadcasting packet (RREQ, RERR, or some other broadcasting packets) is greater than the value of the Hello Interval does the node need to send a Hello packet. Here is the risk that a sender will transmit a packet (Hello packet) through a broken link that has not been detected by Hello messaging. That affect on performance metric of routing protocol i.e. hidden energy consumption routing overhead, packet delivery ration, through put and others. Like when the node distribution is very sparse found in EDRP. There is the packet delivery ratio and the average end-to-end delay gives some negative effect.

6. Proposed Methodology

In this paper proposed that on the basis of analysis, when sender will transmit a packet (Hello packet) through a broken link that has not been detected by Hello messaging that increase the routing overhead and power consumption. In [1], EDRP used Hello packet send as per time elapsed from the last broadcasting packet is more than Hello interval scheme. Here possibility that the node move out the coverage of the source node and hello packet continuously forwarded over broken link. It increased the routing overhead and hidden energy consumption, may also affect the other performance metric.

To overcome that problem, here used “An Adaptive Hello Messaging Scheme for Neighbor Discovery in On-Demand MANET Routing Protocols”, suppression of unnecessary Hello

messaging. Based on the event interval of a node, the Hello interval can be enlarged without reduced detestability of a broken link, which decreases network overhead and hidden energy consumption. Also may reduce the packet delivery ratio and the average end-to-end delay negative effect. Used ns-2 tool to perform the simulation.

7. Possible Outcome and Result

The major possible outcomes are as follows:

- EDRP power consumption investigates without implementing suppressing Hello packet. On theoretical assumption it is more energy consume in MANET.
- After implementing suppressing Hello packet by suing [4], energy consummation and routing over head decreases effectively.
- Reduce the packet delivery ratio and the average end-to-end delay negative effect.
- Investigation adds one more mile stone in EDRP is efficient power consumption routing protocol with position evaluation without GPS in MANET.

8. Conclusion

In review on the EDRP fond that EDRP have the feature to estimate the distance between node and the position of the node from source node. This protocol is important because without GPS it evaluate the position of nodes. But here found that it not evaluated efficiency of energy consumption, this is motivation of the investigation and evaluation of this protocol. In investigation found EDRP used Hello packet to discover the node and link. Hello packet send as per time elapsed from the last broadcasting packet is more than Hello interval scheme. Here possibility that the node move out the coverage of the source node and hello packet continuously forwarded over broken link. It increased the routing overhead and hidden energy consumption, may also affect the other performance metric. To solve that issue, used “An Adaptive Hello Messaging Scheme for Neighbor Discovery in On-Demand MANET Routing Protocols”, suppression of unnecessary Hello messaging. Based on the event interval of a node, the Hello interval can be enlarged without reduced detestability of a broken link, which decreases network overhead and hidden energy consumption. These experiments also reduce the packet delivery ratio and the average end-to-end delay negative effect, when the node distribution is very sparse.

9. Applications

Used in scenario position base routing protocol where GPS system not work**.**

10. Future Scope

There are the packet delivery ratio and the average end-to-end delay give some negative effect, when the node distribution is very sparse. To reduce those negative effects have the space for future work.

11. References

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